

STRIPED DOLPHIN (*Stenella coeruleoalba*): Northern Gulf of Mexico Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The striped dolphin is distributed worldwide in tropical to ~~warm~~ temperate oceanic waters (Leatherwood and Reeves 1983; Perrin *et al.* 1994). Sightings of these animals in the northern Gulf of Mexico occur primarily over the deeper waters off the continental shelf (Mullin and Fulling, in progress) [Mullin *et al.* 1991; Southeast Fisheries Science Center (SEFSC) unpublished data]. Striped dolphins were seen in fall, winter, and spring during recent seasonal GulfCet aerial surveys of the northern Gulf of Mexico between 1993 and 1995 (Davis *et al.*, in preparation and Fargion 1996).

The Gulf of Mexico population is provisionally being considered a separate stock for management purposes, although there is currently no information to differentiate this stock from the Atlantic stock(s). Additional morphological, genetic and/or behavioral data are needed to provide further information on stock delineation.

POPULATION SIZE

Estimates of abundance were derived through the application of distance sampling analysis (Buckland *et al.* 1993) and the computer program DISTANCE (Laake *et al.* 1993) to sighting data. During 1991 through 1994, line-transect vessel surveys were conducted from spring through summer in the northern Gulf of Mexico from the 200 m isobath to the seaward extent of the U.S. Exclusive Economic Zone (EEZ) (Hansen *et al.* 1995). This included data collected as part of the GulfCet program (Davis and Fargion 1996). Estimated abundance of striped dolphins by survey year was 3,483

(Coefficient of variation (CV)=0.76) in 1991, 2,574 (CV=0.52) in 1992, 4,160 (CV=0.63) in 1993 and 8,147 (CV=0.60) in 1994 (Hansen *et al.* 1995). Survey effort-weighted estimated average abundance of striped dolphins for all surveys combined was 4,858 (CV=0.44) (Hansen *et al.* 1995). As recommended in the GAMMS Workshop Report (Wade and Angliss 1997), estimates older than eight years are deemed unreliable, and therefore should not be used for PBR determinations.

Surveys were conducted from April to May 1996 to 2001 (excluding 1998) in oceanic waters of the northern Gulf of Mexico, using the NOAA ships *Oregon II* (1996, 1997, 1999) and *Gordan Gunter* (2000, 2001). Tracklines, which were perpendicular to the bathymetry, covered the waters from 200 m to the offshore extent of the U.S. EEZ. Estimates for all oceanic strata were summed, as survey effort was not uniformly distributed, to calculate a total estimate for the entire northern Gulf of Mexico oceanic waters (Fig. 1; Mullin and Fulling, in progress). Due to limited survey effort in any given year, survey effort was pooled across all years to develop an average abundance estimate.

The estimate of abundance for striped dolphins in oceanic waters, pooled from 1996 to 2001, is 6,258 (CV=0.43) (Mullin and Fulling, in progress), which is the best available abundance estimate for this species in the

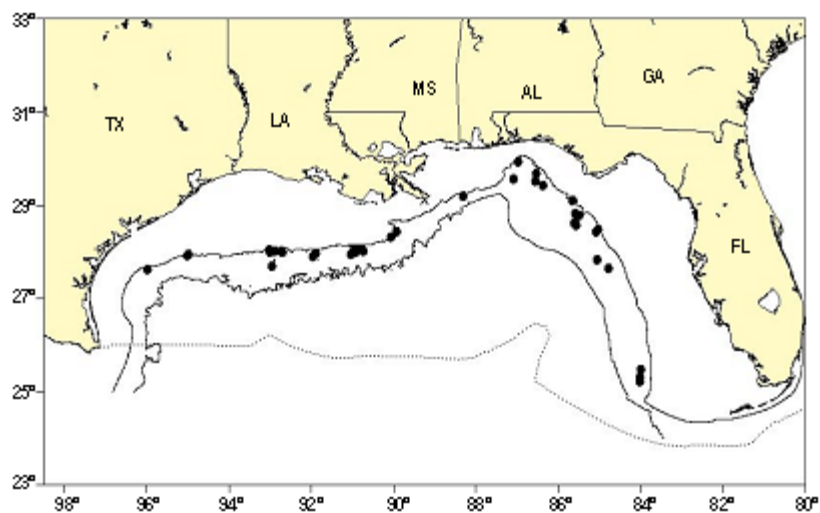


Figure 1. Distribution of striped dolphin sightings from SEFSC shipboard surveys during spring between 1996-2001. All the on-effort sightings are shown, though not all were used to estimate abundance. Solid lines indicate the 100 m and 1000 m isobaths and the dotted line indicates the offshore extent of the U.S. EEZ.

northern Gulf of Mexico. This estimate is considered the best because these surveys have the most complete coverage of the species' habitat. The differences between the older (1991-1994) and the more recent (1996-2001) abundance estimates are being investigated. The analytical methods were not completely similar and may have contributed to these differences. A re-analysis of the earlier data is underway so that valid comparisons can be made to look for population trends.

Minimum Population Estimate

~~The minimum population size was estimated from the average estimate abundance which was 127 Fraser's dolphins (CV = 0.90) (Hansen et al. 1995).~~ The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distributed abundance estimate as specified by Wade and Angliss (1997). ~~NMFS (Anon. 1994).~~ The best estimate of abundance for striped dolphins is 6,258 (CV=0.43). The minimum population estimate for the northern Gulf of Mexico is 4,425 (CV=0.43) striped dolphins.

Current Population Trend

~~No trend was identified in the annual abundance estimates. There were no observations of Fraser's dolphins during 1991 and 1993 vessel surveys, and the 1992 estimate is based on only one observation (Hansen et al. 1995); however, five other sightings of Fraser's dolphins were documented in the northern Gulf of Mexico during other surveys in 1992, 1993 and 1994 (Leatherwood et al. 1993, SEFSC unpublished data). The apparent differences in abundance estimates may have been caused by low sampling intensity relative to population size (Hansen et al. 1995) or by inter-annual variation in distribution patterns or spatial sampling patterns, rather than changes in population size. There are insufficient data to determine the population trends for this species.~~

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. ~~therefore, the default maximum net productivity rate of 0.04 (Anon. 1994) was used for purposes of this assessment.~~ For purposes of this assessment, the maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive history (Barlow et al. 1995).

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal level (PBR) is the product of the minimum population size, one half the maximum net productivity rate, and a recovery factor (MMPA Sec. 3.16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 4,425 (CV=0.43). The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP), is assumed to be 0.5. PBR for the northern Gulf of Mexico striped dolphin is 344.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There has been no reported fishing related mortalities of a striped dolphin between 1997 and 2001 (Yeung 1999; Yeung, 2001). Observed fishery-related mortality and serious injury for striped dolphins is less than 10% of PBR and can be considered insignificant and approaching zero mortality and serious injury rate for this stock.

~~Available information indicates there likely is little, if any, fisheries interaction with striped dolphins in the northern Gulf of Mexico. The total known fishery-related mortality and serious injury for this stock is less than 10% of the calculated PBR and, therefore, can be considered insignificant and approaching zero mortality and serious injury rate. This determination cannot be made for specific fisheries until the implementing regulations for Section 118 of the MMPA have been reviewed by the public and finalized.~~

Fisheries Information

The level of past or current, direct, human-caused mortality of striped dolphins in the northern Gulf of Mexico is unknown. Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. Total U.S. longline effort for the Gulf of Mexico pelagic fishery, including OCS edge,

continental slope, and Mexican territorial waters, based on mandatory logbook reporting, was ~~4,400 sets in 1991, 4,850 sets in 1992, and 3,260 sets in 1993 (Cramer 1994)~~ 3,138 sets in 1998, 4,270 sets in 1999 and 4,483 sets in 2000 (Yeung 1999; Yeung, 2001). This fishery has been monitored with about 5% observer coverage, in terms of trips observed, since 1992. Observer coverage for the Gulf as a percentage of total sets was 2% in 1998, 4% in 1999 and 4% in 2000. There were no reports of mortality or serious injury to striped dolphins by this fishery.

~~Pair trawl fishing gear has the potential to capture marine mammals, but there have been no reports of mortality or serious injury to marine mammals in the Gulf of Mexico. This fishery, which operated along the west coast of Florida during 1997-1999, has not been observed by NMFS observers, and there are no other data available as to the extent of this fishery in the Gulf of Mexico. It is assumed that it is very limited in scope and duration.~~

Other Mortality

There was one reported strandings of a striped dolphin in the Gulf of Mexico between 1997 and 2001. There was no evidence of human interactions in this stranded animal. Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured in fishery interactions wash ashore, ~~not all that wash ashore are discovered, reported or investigated~~, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interactions.

STATUS OF STOCK

The status of ~~striped dolphins in the northern Gulf of Mexico~~, relative to OSP, is unknown. ~~The species is not listed as threatened or endangered under the Endangered Species Act. There and there are insufficient data to determine the population trends for this species. The total fishery-related mortality and serious injury for this stock is unknown, but assumed to be less than 10% of the calculated PBR and can be considered to be insignificant and approaching zero mortality and serious injury rate. This is not a strategic stock because average annual fishery-related mortality and serious injury has not exceeded PBR for the last two years. This species is not listed under the Endangered Species Act. The total level of human-caused mortality and serious injury is unknown, but it is believed to be low relative to PBR, therefore, this is not a strategic stock~~

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SPINNER DOLPHIN (*Stenella longirostris*): Northern Gulf of Mexico Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The spinner dolphin is distributed worldwide in tropical to ~~warm~~ temperate oceanic waters (Leatherwood and Reeves 1983; Perrin *et al.* 1994). Sightings of these animals in the northern Gulf of Mexico occur primarily over the deeper waters off the continental shelf (Mullin and Fulling, in progress) [Mullin *et al.* 1991; Southeast Fisheries Science Center (SEFSC) unpublished data]. Spinner dolphins were seen in fall, winter, and spring during recent seasonal GulfCet aerial surveys of the northern Gulf of Mexico between 1993 and 1995 (Davis *et al.*, in preparation and Fargion 1996).

The Gulf of Mexico population is provisionally being considered a separate stock for management purposes, although there is currently no information to differentiate this stock from the Atlantic stock(s). Additional morphological, genetic and/or behavioral data are needed to provide further information on stock delineation.

POPULATION SIZE

Estimates of abundance were derived through the application of distance sampling analysis (Buckland *et al.* 1993) and the computer program DISTANCE (Laake *et al.* 1993) to sighting data. During 1991 through 1994, line-transect vessel surveys were conducted from spring through summer in the northern Gulf of Mexico from the 200 m isobath to the seaward extent of the U.S. Exclusive Economic Zone (EEZ) (Hansen *et al.* 1995). This included data collected as part of the GulfCet program (Davis and Fargion 1996). Estimated abundance of spinner dolphins by survey year was zero in 1991, 2,593 (Coefficient of variation (CV)=0.63) in 1992, 2,336 (CV=0.62) in 1993 and 15,995 (CV=0.67) in 1994 (Hansen *et al.* 1995). Survey effort-weighted estimated average abundance of spinner dolphins for all surveys combined was 6,316 (CV=0.43) (Hansen *et al.* 1995). As recommended in the GAMMS Workshop Report (Wade and Angliss 1997), estimates older than eight years are deemed unreliable, and therefore should not be used for PBR determinations.

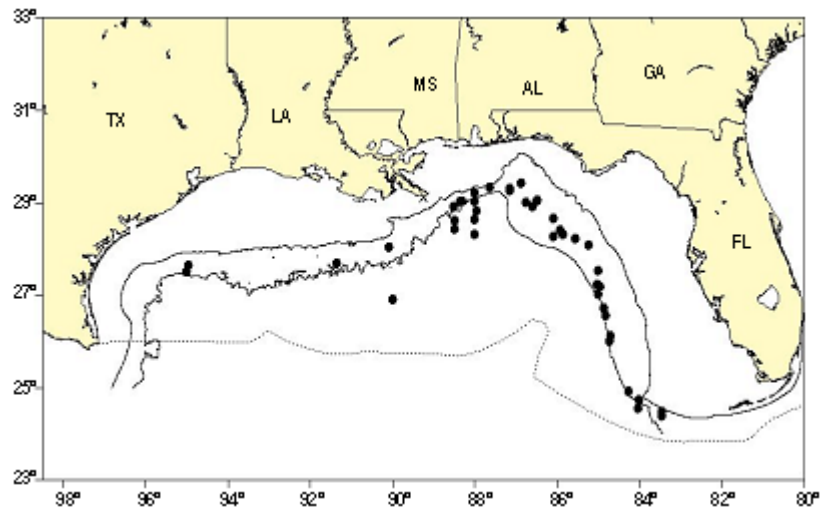


Figure 1. Distribution of spinner dolphin sightings from SEFSC shipboard surveys during spring between 1996-2001. All the on-effort sightings are shown, though not all were used to estimate abundance. Solid lines indicate the 100 m and 1000 m isobaths and the dotted line indicates the offshore extent of the U.S. EEZ.

Surveys were conducted from April to May 1996 to 2001 (excluding 1998) in oceanic waters of the northern Gulf of Mexico, using the NOAA ships *Oregon II* (1996, 1997, 1999) and *Gordan Gunter* (2000, 2001). Tracklines, which were perpendicular to the bathymetry, covered the waters from 200 m to the offshore extent of the U.S. EEZ. Estimates for all oceanic strata were summed, as survey effort was not uniformly distributed, to calculate a total estimate for the entire northern Gulf of Mexico oceanic waters (Fig. 1; Mullin and Fulling, in progress). Due to limited survey effort in any given year, survey effort was pooled across all years to develop an average abundance estimate.

The estimate of abundance for spinner dolphins in oceanic waters, pooled from 1996 to 2001, is 11,550 (CV=0.72) (Mullin and Fulling, in progress), which is the best available abundance estimate for this species in the northern Gulf of Mexico. This estimate is considered the best because these surveys have the most complete coverage of the species' habitat. The differences between the older (1991-1994) and the more recent (1996-2001) abundance estimates are being investigated. The analytical methods were not completely similar and may have contributed to these differences. A re-analysis of the earlier data is underway so that valid comparisons can be made to look for population trends.

Minimum Population Estimate

~~The minimum population size was estimated from the average estimate abundance which was 127 Fraser's dolphins (CV = 0.90) (Hansen et al. 1995). The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distributed abundance estimate as specified by Wade and Angliss (1997). NMFS (Anon. 1994). The best estimate of abundance for spinner dolphins is 11,550 (CV=0.72). The minimum population estimate for the northern Gulf of Mexico is 6,702 (CV=0.72) spinner dolphins.~~

Current Population Trend

~~No trend was identified in the annual abundance estimates. There were no observations of Fraser's dolphins during 1991 and 1993 vessel surveys, and the 1992 estimate is based on only one observation (Hansen et al. 1995); however, five other sightings of Fraser's dolphins were documented in the northern Gulf of Mexico during other surveys in 1992, 1993 and 1994 (Leatherwood et al. 1993, SEFSC unpublished data). The apparent differences in abundance estimates may have been caused by low sampling intensity relative to population size (Hansen et al. 1995) or by inter-annual variation in distribution patterns or spatial sampling patterns, rather than changes in population size. There are insufficient data to determine the population trends for this species.~~

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. ~~therefore, the default maximum net productivity rate of 0.04 (Anon. 1994) was used for purposes of this assessment~~For purposes of this assessment, the maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive history (Barlow et al. 1995).

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal level (PBR) is the product of the minimum population size, one half the maximum net productivity rate, and a recovery factor (MMPA Sec. 3.16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 6,702 (CV=0.72). The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP), is assumed to be 0.5. PBR for the northern Gulf of Mexico spinner dolphin is 4567.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There has been no reported fishing related mortalities of a spinner dolphin between 1997 and 2001 (Yeung 1999; Yeung, 2001). Observed fishery-related mortality and serious injury for spinner dolphins is less than 10% of PBR and can be considered insignificant and approaching zero mortality and serious injury rate for this stock.

~~Available information indicates there likely is little, if any, fisheries interaction with spinner dolphins in the northern Gulf of Mexico. The total known fishery-related mortality and serious injury for this stock is less than 10% of the calculated PBR and, therefore, can be considered insignificant and approaching zero mortality and serious injury rate. This determination cannot be made for specific fisheries until the implementing regulations for Section 118 of the MMPA have been reviewed by the public and finalized.~~

Fisheries Information

The level of past or current, direct, human-caused mortality of spinner dolphins in the northern Gulf of Mexico is unknown. Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. Total U.S. longline effort for the Gulf of Mexico pelagic fishery, including OCS edge, continental slope, and Mexican territorial waters, based on mandatory logbook reporting, was ~~4,400 sets in 1991, 4,850 sets in 1992, and 3,260 sets in 1993 (Cramer 1994)~~ 3,138 sets in 1998, 4,270 sets in 1999 and 4,483 sets in 2000 (Yeung 1999; Yeung, 2001). This fishery has been monitored with about 5% observer coverage, in terms of trips observed, since 1992. Observer coverage for the Gulf as a percentage of total sets was 2% in 1998, 4% in 1999 and 4% in 2000. There were no reports of mortality or serious injury to spinner dolphins by this fishery.

~~Pair trawl fishing gear has the potential to capture marine mammals, but there have been no reports of mortality or serious injury to marine mammals in the Gulf of Mexico. This fishery, which operated along the west coast of Florida during 1997-1999, has not been observed by NMFS observers, and there are no other data available as to the extent of this fishery in the Gulf of Mexico. It is assumed that it is very limited in scope and duration.~~

Other Mortality

There were two reported strandings of spinner dolphins in the Gulf of Mexico between 1997 and 2001. There was no evidence of human interactions in these stranded animals. Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured in fishery interactions wash ashore, ~~not all that wash ashore are discovered, reported or investigated~~, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interactions.

STATUS OF STOCK

The status of spinner dolphins in the northern Gulf of Mexico, relative to OSP, is unknown. The species is not listed as threatened or endangered under the Endangered Species Act. ~~There and there are insufficient data to determine the population trends for this species. The total fishery-related mortality and serious injury for this stock is unknown, but assumed to be less than 10% of the calculated PBR and can be considered to be insignificant and approaching zero mortality and serious injury rate. This is not a strategic stock because average annual fishery-related mortality and serious injury has not exceeded PBR for the last two years. This species is not listed under the Endangered Species Act. The total level of human-caused mortality and serious injury is unknown, but it is believed to be low relative to PBR; therefore, this is not a strategic stock~~

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ROUGH-TOOTHED DOLPHIN (*Steno bredanensis*): Northern Gulf of Mexico Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The rough-toothed dolphin is distributed worldwide in tropical to warm temperate waters (Leatherwood and Reeves 1983; Miyazaki and Perrin 1994). Sightings of these animals in the northern Gulf of Mexico occur primarily over the deeper waters off the continental shelf (Mullin and Fulling, in progress) [~~Southeast Fisheries Science Center (SEFSC) unpublished data~~]. Rough-toothed dolphins were seen in all seasons during ~~recent seasonal~~ GulfCet aerial surveys of the northern Gulf of Mexico between 1993 and 1995 (Davis ~~et al., in preparation~~ and Fargion 1996).

The Gulf of Mexico population is provisionally being considered one stock for management purposes. Additional morphological, genetic and/or behavioral data are needed to provide further information on stock delineation.

POPULATION SIZE

Estimates of abundance were derived through the application of distance sampling analysis (Buckland *et al.* 1993) and the computer program DISTANCE (Laake *et al.* 1993) to sighting data. During 1991 through 1994, line-transect vessel surveys were conducted from spring through summer in the northern Gulf of Mexico from the 200 m isobath to the seaward extent of the U.S. Exclusive Economic Zone (EEZ) (Hansen *et al.* 1995). This included data collected as part of the GulfCet program (Davis and Fargion 1996). Estimated abundance of rough-toothed dolphins by survey year was 545 (Coefficient of variation (CV)=1.15) in 1991, 758 (CV=0.58) in 1992, 1,192 (CV=0.48) in 1993, and 527 (CV=0.86) in 1994 (Hansen *et al.* 1995). Survey effort-weighted estimated average abundance of rough-toothed dolphins for all surveys combined was 852 (CV=0.31) (Hansen *et al.* 1995). This is probably an underestimate and should be considered a partial stock estimate because the continental shelf areas were not entirely covered by either the vessel or GulfCet aerial surveys. As recommended in the GAMMS Workshop Report (Wade and Angliss 1997), estimates older than eight years are deemed unreliable, and therefore should not be used for PBR determinations.

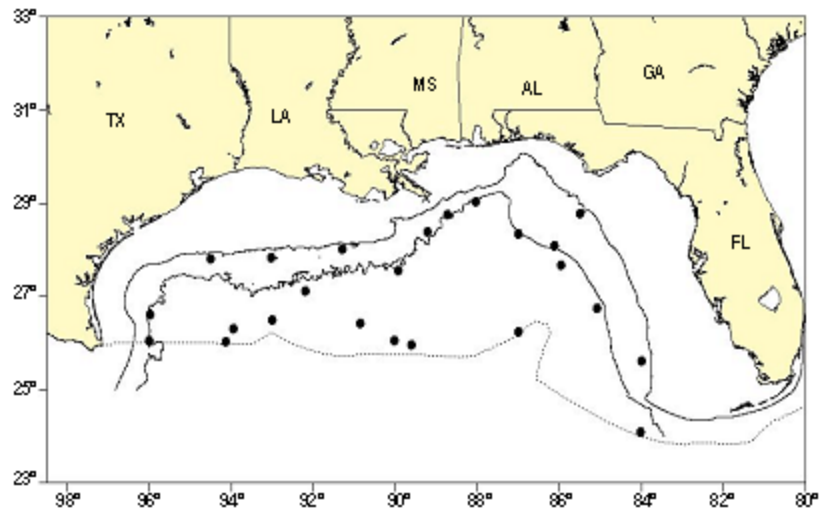


Figure 1. Distribution of rough-toothed dolphin sightings from SEFSC shipboard surveys during spring and fall between 1996-2001. All the on-effort sightings are shown, though not all were used to estimate abundance. Solid lines indicate the 100 m and 1000 m isobaths and the dotted line shows the offshore extent of the U.S. EEZ.

Data were collected from 1996-2001 during spring and fall plankton surveys conducted from the NOAA ships *Oregon II* (1996, 1997, and 1999) and *Gordan Gunter* (2000, 2001). Tracklines, which were perpendicular to the bathymetry, covered shelf waters from the 10 m to the 200 m isobaths in the fall of 1998 and 1999 and were extended into the upper slope waters from 500 m to 1000 m in 2000 and 2001 (Fig. 1 and Table 1; Fulling *et al.* in review). Surveys were also conducted from April to May 1996 to 2001 (excluding 1998) in oceanic waters of the northern Gulf of Mexico from 200 m to the offshore extent of the U.S. EEZ. Estimates for all oceanic strata were

summed, as survey effort was not uniformly distributed, to calculate a total estimate for the entire northern Gulf of Mexico oceanic waters (Fig. 1 and Table 1; Mullin and Fulling, in progress). Due to limited survey effort in any given year, survey effort was pooled across all years to develop an average abundance estimate for both areas.

Table 1. Abundance estimates (N_{best}) and Coefficient of Variation (CV) of rough-toothed dolphins in the northern U.S. Gulf of Mexico outer continental shelf (OCS) (waters 20-200 m deep) during fall 1998-2001 and oceanic waters (200m to the offshore extent of the EEZ) during spring 1996-2001 (excluding 1998).

Month/Year	Area	N_{best}	CV
Fall 1998-2001	Outer Continental Shelf	1,238	0.65
Spring 1996-2001	Oceanic	1,231	0.45
Spring & Fall 1996-2001	OCS & Oceanic	2,469	0.40

The combined estimated abundance of rough-toothed dolphins, pooled from 1998 through 2001, for the outer continental shelf shipboard surveys was 1,238 (CV=0.65) (Fulling *et al.* in review). The estimate of abundance for rough-toothed dolphins in oceanic waters, pooled from 1996 through 2001, is 1,231 (CV=0.45) (Mullin and Fulling, in progress).

The best available abundance estimate for the rough-toothed dolphin in the northern Gulf of Mexico is the combined estimate of abundance for both the outer continental shelf and oceanic waters from 1996 to 2001, which is 2,469 (CV=0.40). This estimate is considered the best because these surveys have the most complete coverage of the species' habitat. This species was only rarely observed in the shelf waters, with only two sightings occurring off the coast of Texas and only one sighting off the southern Florida Panhandle (Fulling *et al.* in review). Group sizes recorded for rough-toothed dolphins in the shelf waters were 8, 11 and 20 individuals. The differences between the older (1991-1994) and the more recent (1996-2001) abundance estimates are being investigated. The analytical methods were not completely similar and may have contributed to these differences. A re-analysis of the earlier data is underway so that valid comparisons can be made to look for population trends.

Minimum Population Estimate

~~The minimum population size was estimated using the average abundance estimate of Rough-toothed dolphins for all surveys combined which was 3,213 (CV = 0.44) (Hansen et al. 1995). The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distributed abundance estimate as specified by Wade and Angliss (1997). NMFS (Anon. 1994). The best estimate of abundance for rough-toothed dolphins is 2,469 (CV=0.40). The minimum population estimate for the northern Gulf of Mexico is 1,785 (CV=0.40) rough-toothed dolphins.~~

Current Population Trend

~~No trend was identified in the annual abundance estimates. There were no sightings of this stock during 1991. The lack of sightings during 1991 may have been due to less sampling that year along the continental shelf edge where sightings of this species were concentrated. The difference in abundance estimates during 1992-1994 were not significant using the criteria of no overlap of log-normal 95 % confidence intervals. There are insufficient data to determine the population trends for this species.~~

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

~~Current and maximum net productivity rates are unknown for this stock. therefore, the default maximum net productivity rate of 0.04 (Anon. 1994) was used for purposes of this assessment. For purposes of this assessment, the maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive history (Barlow et al. 1995).~~

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal level (PBR) is the product of the minimum population size, one half the maximum net productivity rate, and a “recovery” factor (MMPA Sec. 3.16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 1,785 (CV=0.40). The maximum productivity rate is 0.04, the default value for cetaceans. The “recovery” factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.5. PBR for the northern Gulf of Mexico rough-toothed dolphin is 6,618.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There were two documented strandings of rough-toothed dolphins in the northern Gulf of Mexico during 1987-1994 which were classified as likely caused by fishery interactions. ~~However, there have been no recent reports of fishery interactions in stranded animals. Total estimated average annual fishing-related mortality and serious injury of spotted dolphins (both species) during 1992-1993 is 1.5 spotted dolphins annually (CV = 0.33). There has been no reported fishing related mortality of rough-toothed dolphins (Yeung 1999; Yeung, 2001).~~ Observed fishery-related mortality and serious injury for rough-toothed dolphins is less than 10% of PBR and can be considered insignificant and approaching zero mortality and serious injury rate for this stock.

Fisheries Information

The level of past or current, direct, human-caused mortality of rough-toothed dolphins in the northern Gulf of Mexico is unknown. Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. Total U.S. longline effort for the Gulf of Mexico pelagic fishery, including OCS edge, continental slope, and Mexican territorial waters, based on mandatory logbook reporting, was ~~4,400 sets in 1991, 4,850 sets in 1992, and 3,260 sets in 1993 (Cramer 1994) 3,138 sets in 1998, 4,270 sets in 1999 and 4,483 sets in 2000 (Yeung 1999; Yeung, 2001). This fishery has been monitored with about 5% observer coverage, in terms of trips observed, since 1992. Observer coverage for the Gulf as a percentage of total sets was 2% in 1998, 4% in 1999 and 4% in 2000. There were no reports of mortality or serious injury to rough-toothed dolphins by this fishery in the Gulf of Mexico. Estimates of fishery-related mortality and serious injury were based on a generalized linear model (Poisson error assumption) fit to the available observed incidental take for the entire Atlantic longline swordfish/tuna fishery (which includes the Gulf of Mexico) (SEFSC, unpublished data). Takes observed throughout the range of this fishery were used because the species occurs generally throughout the area of the fishery, but observed takes were infrequent in any given region.~~

~~Pair trawl fishing gear has the potential to capture marine mammals, but there have been no reports of mortality or serious injury to marine mammals in the Gulf of Mexico. This fishery, which operated along the west coast of Florida during 1997-1999, has not been observed by NMFS observers, and there are no other data available as to the extent of this fishery in the Gulf of Mexico. It is assumed that it is very limited in scope and duration.~~

Other Mortality

There ~~were no documented~~ ~~was one reported stranding~~ of a rough-toothed dolphin in the northern Gulf of Mexico between 1997 and ~~1994~~ 2001 which ~~were was~~ classified as likely caused by fishery interactions or other human-related causes. Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured in fishery interactions wash ashore, ~~not all that wash ashore are discovered, reported or investigated~~, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interactions.

STATUS OF STOCK

The status of ~~rough-toothed dolphins in the northern Gulf of Mexico~~, relative to OSP, is unknown. ~~The species is not listed as threatened or endangered under the Endangered Species Act. There and there are~~ insufficient data to determine the population trends for this species. The total fishery-related mortality and serious injury for this stock is unknown, but assumed to be less than 10% of the calculated PBR and can be considered to be insignificant and approaching zero mortality and serious injury rate. This is not a strategic stock because

average annual fishery-related mortality and serious injury has not exceeded PBR for the last two years. This species is not listed under the Endangered Species Act. The total level of human-caused mortality and serious injury is unknown, but it is believed to be low relative to PBR; therefore, this is not a strategic stock. The potential impact, if any, of coastal pollution may be an issue for this species in portions of its habitat, though little is known on this to date

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CLYMENE'S DOLPHIN (*Stenella clymene*): Northern Gulf of Mexico Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The Clymene dolphin is endemic to tropical and sub-tropical waters of the Atlantic (Leatherwood and Reeves 1983; Perrin and Mead 1994). Sightings of these animals in the northern Gulf of Mexico occur primarily over the deeper waters off the continental shelf (Mullin *et al.* 1994). Clymene dolphins were seen in the winter, spring and summer during ~~recent seasonal~~ GulfCet aerial surveys of the northern Gulf of Mexico during 1993 to 1995 (Davis ~~et al., in preparation~~ and Fargion 1996).

~~The Gulf of Mexico population is provisionally being considered a separate stock for management purposes, although there is currently no information to differentiate this stock from the Atlantic stock(s). Additional morphological, genetic and/or behavioral data are needed to provide further information on stock delineation. There is no information on stock differentiation for the Atlantic population.~~

POPULATION SIZE

Estimates of abundance were derived through the application of distance sampling analysis (Buckland *et al.* 1993) and the computer program DISTANCE (Laake *et al.* 1993) to sighting data. During 1991 through 1994, line-transect vessel surveys were conducted from spring through summer in the northern Gulf of Mexico from the 200 m isobath to the seaward extent of the U.S. Exclusive Economic Zone (EEZ) (Hansen *et al.* 1995). This included data collected as part of the GulfCet program (Davis and Fargion 1996). Estimated abundance of Clymene's dolphins by survey year was 1,936 (Coefficient of variation (CV)=0.69) in 1991, 3,390 (CV=0.48) in 1992, 6,486 (CV=0.46) in 1993, and 12,255 (CV=0.62) in 1994 (Hansen *et al.* 1995). Survey effort-weighted estimated average abundance of Clymene's dolphins for all surveys combined was 5,571 (CV=0.37) (Hansen *et al.* 1995). ~~As recommended in the GAMMS Workshop Report (Wade and Angliss 1997), estimates older than eight years are deemed unreliable, and therefore should not be used for PBR determinations.~~

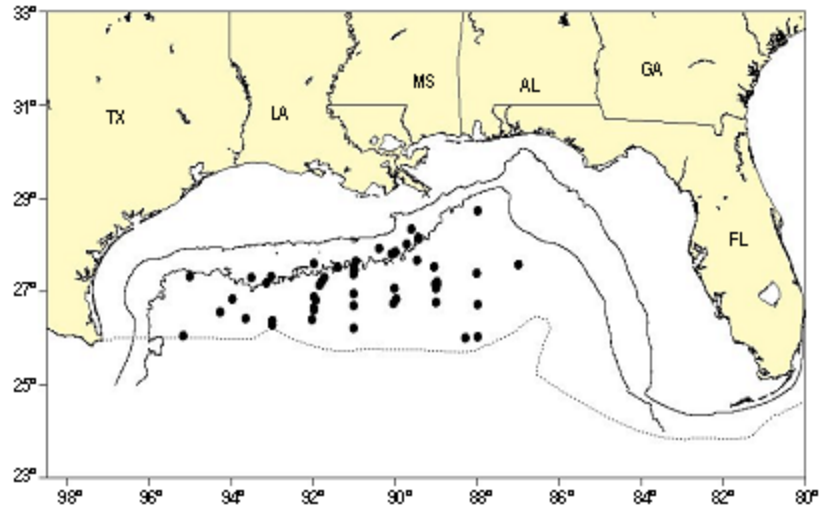


Figure 1. *Distribution of Clymene's dolphin sightings from SEFSC shipboard surveys during spring between 1996-2001. All the on-effort sightings are shown, though not all were used to estimate abundance. Solid lines indicate the 100 m and 1000 m isobaths and the dotted line indicates the offshore extent of the U.S. EEZ.*

Surveys were conducted from April to May 1996 to 2001 (excluding 1998) in oceanic waters of the northern Gulf of Mexico, using the NOAA ships *Oregon II* (1996, 1997, 1999) and *Gordan Gunter* (2000, 2001). Tracklines, which were perpendicular to the bathymetry, covered the waters from 200 m to the offshore extent of the U.S. EEZ. Estimates for all oceanic strata were summed, as survey effort was not uniformly distributed, to calculate a total estimate for the entire northern Gulf of Mexico oceanic waters (Fig. 1; Mullin and Fulling, in progress). Due to limited survey effort in any given year, survey effort was pooled across all years to develop an average abundance estimate.

The estimate of abundance for Clymene's dolphins in oceanic waters, pooled from 1996 to 2001, is 16,439 (CV=0.66) (Mullin and Fulling, in progress), which is the best available abundance estimate for this species in the northern Gulf of Mexico. This estimate is considered the best because these surveys have the most complete coverage of the species' habitat. The differences between the older (1991-1994) and the more recent (1996-2001) abundance estimates are being investigated. The analytical methods were not completely similar and may have contributed to these differences. A re-analysis of the earlier data is underway so that valid comparisons can be made to look for population trends.

Minimum Population Estimate

~~The minimum population size was estimated from the average estimate abundance which was 127 Fraser's dolphins (CV = 0.90) (Hansen et al. 1995). The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distributed abundance estimate as specified by Wade and Angliss (1997). NMFS (Anon. 1994). The best estimate of abundance for Clymene's dolphins is 16,439 (CV=0.66). The minimum population estimate for the northern Gulf of Mexico is 9,910 (CV=0.66) Clymene's dolphins.~~

Current Population Trend

~~No trend was identified in the annual abundance estimates. There were no observations of Fraser's dolphins during 1991 and 1993 vessel surveys, and the 1992 estimate is based on only one observation (Hansen et al. 1995); however, five other sightings of Fraser's dolphins were documented in the northern Gulf of Mexico during other surveys in 1992, 1993 and 1994 (Leatherwood et al. 1993, SEFSC unpublished data). The apparent differences in abundance estimates may have been caused by low sampling intensity relative to population size (Hansen et al. 1995) or by inter-annual variation in distribution patterns or spatial sampling patterns, rather than changes in population size. There are insufficient data to determine the population trends for this species.~~

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. ~~therefore, the default maximum net productivity rate of 0.04 (Anon. 1994) was used for purposes of this assessment.~~ For purposes of this assessment, the maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive history (Barlow *et al.* 1995).

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal level (PBR) is the product of the minimum population size, one half the maximum net productivity rate, and a recovery factor (MMPA Sec. 3.16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 9,910 (CV=0.66). The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP), is assumed to be 0.5. PBR for the northern Gulf of Mexico Clymene's dolphin is 4199.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There has been no reported fishing related mortality of Clymene's dolphins (Yeung 1999; Yeung, 2001). Observed fishery-related mortality and serious injury for Clymene's dolphins is less than 10% of PBR and can be considered insignificant and approaching zero mortality and serious injury rate for this stock.

~~Available information indicates there likely is little, if any, fisheries interaction with Clymene's dolphins in the northern Gulf of Mexico. The total known fishery-related mortality and serious injury for this stock is less than 10% of the calculated PBR and, therefore, can be considered insignificant and approaching zero mortality and serious injury rate. This determination cannot be made for specific fisheries until the implementing regulations for Section 118 of the MMPA have been reviewed by the public and finalized.~~

Fisheries Information

The level of past or current, direct, human-caused mortality of Clymene's dolphins in the northern Gulf of Mexico is unknown. Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. Total U.S. longline effort for the Gulf of Mexico pelagic fishery, including OCS edge, continental slope, and Mexican territorial waters, based on mandatory logbook reporting, was ~~4,400 sets in 1991, 4,850 sets in 1992, and 3,260 sets in 1993 (Cramer 1994)~~ 3,138 sets in 1998, 4,270 sets in 1999 and 4,483 sets in 2000 (Yeung 1999; Yeung, 2001). ~~This fishery has been monitored with about 5% observer coverage, in terms of trips observed, since 1992. Observer coverage for the Gulf as a percentage of total sets was 2% in 1998, 4% in 1999 and 4% in 2000. There were no reports of mortality or serious injury to Clymene's dolphins by this fishery.~~

~~Pair trawl fishing gear has the potential to capture marine mammals, but there have been no reports of mortality or serious injury to marine mammals in the Gulf of Mexico. This fishery, which operated along the west coast of Florida during 1997-1999 has not been observed by NMFS observers, and there are no other data available as to the extent of this fishery in the Gulf of Mexico. It is assumed that it is very limited in scope and duration.~~

Other Mortality

There was one reported stranding of a Clymene's dolphin in the Gulf of Mexico between 1997 and 2001. There was no indication of human interactions. There is some uncertainty in the identification of this specimen due to similarities with other *Stenella* species. Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured in fishery interactions wash ashore, ~~not all that wash ashore are discovered, reported or investigated~~, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interactions.

STATUS OF STOCK

The status of Clymene's dolphins in the northern Gulf of Mexico, relative to OSP, is unknown. The species is not listed as threatened or endangered under the Endangered Species Act. ~~There and there are insufficient data to determine the population trends for this species. The total fishery-related mortality and serious injury for this stock is unknown, but assumed to be less than 10% of the calculated PBR and can be considered to be insignificant and approaching zero mortality and serious injury rate. This is not a strategic stock because average annual fishery-related mortality and serious injury has not exceeded PBR for the last two years. This species is not listed under the Endangered Species Act. The total level of human-caused mortality and serious injury is unknown, but it is believed to be low relative to PBR; therefore, this is not a strategic stock~~

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FRASER'S DOLPHIN (*Lagenodelphis hosei*): Northern Gulf of Mexico Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Fraser's dolphin is distributed worldwide in tropical waters (Perrin *et al.* 1994). Sightings of these animals in the northern Gulf of Mexico occur primarily over the deeper waters off the continental shelf (Leatherwood *et al.* 1993). Fraser's dolphins have been observed ~~recently~~ in the northern Gulf of Mexico during the spring, summer, and fall (Leatherwood *et al.* 1993), and also were seen in the winter during ~~recent seasonal~~ GulfCet aerial surveys of the northern Gulf of Mexico from 1993 to 1995 (Davis ~~et al., in preparation and Fargion 1996~~). ~~There is no information on stock differentiation for the Atlantic population. The Gulf of Mexico population is provisionally being considered one stock for management purposes. Additional morphological, genetic and/or behavioral data are needed to provide further information on stock delineation.~~

POPULATION SIZE

Estimates of abundance were derived through the application of distance sampling analysis (Buckland *et al.* 1993) and the computer program DISTANCE (Laake *et al.* 1993) to sighting data. During 1991 through 1994, line-transect vessel surveys were conducted from spring through summer in the northern Gulf of Mexico from the 200 m isobath to the seaward extent of the U.S. Exclusive Economic Zone (EEZ) (Hansen *et al.* 1995). This included data collected as part of the GulfCet program (Davis and Fargion 1996). Estimated abundance of Fraser's dolphins by survey year was zero in 1991, 443 in 1992 (Coefficient of variation (CV)=0.92), and zero in 1993 and 1994 (Hansen *et al.* 1995). Survey effort-weighted estimated average abundance of Fraser's dolphins for all surveys combined was 127 (CV = 0.90) (Hansen *et al.* 1995). ~~As recommended in the GAMMS Workshop Report (Wade and Angliss 1997), estimates older than eight years are deemed unreliable, and therefore should not be used for PBR determinations. Surveys were conducted from April to May 1996 to 2001 (excluding 1998) in oceanic waters of the northern Gulf of Mexico, using the NOAA ships Oregon II (1996, 1997, 1999) and Gordan Gunter (2000, 2001). Tracklines, which were perpendicular to the bathymetry, covered the waters from 200 m to the offshore extent of the U.S. EEZ. Estimates for all oceanic strata were summed, as survey effort was not uniformly distributed, to calculate a total estimate for the entire northern Gulf of Mexico oceanic waters (Fig. 1; Mullin and Fulling, in progress). Due to limited survey effort in any given year, survey effort was pooled across all years to develop an average abundance estimate.~~

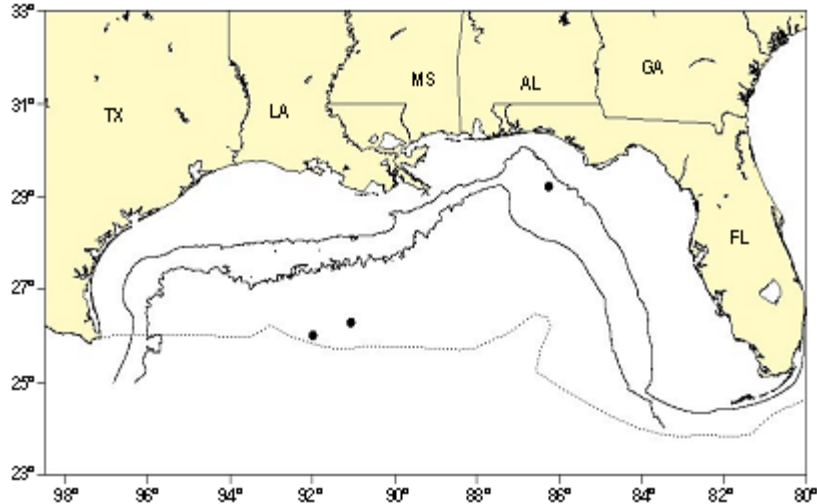


Figure 1. Distribution of Fraser's dolphin sightings from SEFSC shipboard surveys during spring between 1996-2001. All the on-effort sightings are shown, though not all were used to estimate abundance. Solid lines indicate the 100 m and 1000 m isobaths and the dotted line indicates the offshore extent of the U.S. EEZ.

The estimate of abundance for Fraser's dolphins in oceanic waters, pooled from 1996 to 2001, is 698 (CV=0.71) (Mullin and Fulling, in progress), which is the best available abundance estimate for this species in the

northern Gulf of Mexico. This estimate is considered the best because these surveys have the most complete coverage of the species' habitat. The differences between the older (1991-1994) and the more recent (1996-2001) abundance estimates are being investigated. The analytical methods were not completely similar and may have contributed to these differences. A re-analysis of the earlier data is underway so that valid comparisons can be made to look for population trends.

Minimum Population Estimate

~~The minimum population size was estimated from the average estimate abundance which was 127 Fraser's dolphins (CV = 0.90) (Hansen et al. 1995). The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed abundance estimate. This is equivalent to the 20th percentile of the log-normal distributed abundance estimate as specified by Wade and Angliss (1997). NMFS (Anon. 1994). The best estimate of abundance for Fraser's dolphins is 698 (CV=0.71). The minimum population estimate for the northern Gulf of Mexico is 408 (CV=0.71) Fraser's dolphins.~~

Current Population Trend

~~No trend was identified in the annual abundance estimates. There were no observations of Fraser's dolphins during 1991 and 1993 vessel surveys, and the 1992 estimate is based on only one observation (Hansen et al. 1995); however, five other sightings of Fraser's dolphins were documented in the northern Gulf of Mexico during other surveys in 1992, 1993 and 1994 (Leatherwood et al. 1993, SEFSC unpublished data). The apparent differences in abundance estimates may have been caused by low sampling intensity relative to population size (Hansen et al. 1995) or by inter-annual variation in distribution patterns or spatial sampling patterns, rather than changes in population size. There are insufficient data to determine the population trends for this species.~~

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. ~~therefore, the default maximum net productivity rate of 0.04 (Anon. 1994) was used for purposes of this assessment~~For purposes of this assessment, the maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive history (Barlow et al. 1995).

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal level (PBR) is the product of the minimum population size, one half the maximum net productivity rate, and a recovery factor (MMPA Sec. 3.16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 408 (CV=0.71). The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP), is assumed to be 0.5. PBR for the northern Gulf of Mexico Fraser's dolphin is ~~0.7~~ 4.1.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There has been no reported fishing related mortality of Fraser's dolphins (Yeung 1999, Yeung, 2001). Observed fishery-related mortality and serious injury for Fraser's dolphins is less than 10% of PBR and can be considered insignificant and approaching zero mortality and serious injury rate for this stock.

~~Available information indicates there likely is little, if any, fisheries interaction with Fraser's dolphins in the northern Gulf of Mexico. The total known fishery-related mortality and serious injury for this stock is less than 10% of the calculated PBR and, therefore, can be considered insignificant and approaching zero mortality and serious injury rate. This determination cannot be made for specific fisheries until the implementing regulations for Section 118 of the MMPA have been reviewed by the public and finalized.~~

Fisheries Information

The level of past or current, direct, human-caused mortality of Fraser's dolphins in the northern Gulf of Mexico is unknown. Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. Total U.S. longline effort for the Gulf of Mexico pelagic fishery, including OCS edge,

continental slope, and Mexican territorial waters, based on mandatory logbook reporting, was ~~4,400 sets in 1991, 4,850 sets in 1992, and 3,260 sets in 1993 (Cramer 1994)~~ 3,138 sets in 1998, 4,270 sets in 1999 and 4,483 sets in 2000 (Yeung 1999; Yeung, 2001). This fishery has been monitored with about 5% observer coverage, in terms of trips observed, since 1992. Observer coverage for the Gulf as a percentage of total sets was 2% in 1998, 4% in 1999 and 4% in 2000. There were no reports of mortality or serious injury to Fraser's dolphins by this fishery.

~~Pair trawl fishing gear has the potential to capture marine mammals, but there have been no reports of mortality or serious injury to marine mammals in the Gulf of Mexico. This fishery, which operated along the west coast of Florida during 1997-1999, has not been observed by NMFS observers, and there are no other data available as to the extent of this fishery in the Gulf of Mexico. It is assumed that it is very limited in scope and duration.~~

Other Mortality

There were no reported strandings of Fraser's dolphins in the Gulf of Mexico between 1997 and 2001. Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured in fishery interactions wash ashore, ~~not all that wash ashore are discovered, reported or investigated~~, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interactions.

STATUS OF STOCK

The status of ~~Fraser's dolphins in the northern Gulf of Mexico~~, relative to OSP, is unknown. ~~The species is not listed as threatened or endangered under the Endangered Species Act. There and there are insufficient data to determine the population trends for this species. The total fishery-related mortality and serious injury for this stock is unknown, but assumed to be less than 10% of the calculated PBR and can be considered to be insignificant and approaching zero mortality and serious injury rate. This is not a strategic stock because average annual fishery-related mortality and serious injury has not exceeded PBR for the last two years. This species is not listed under the Endangered Species Act. The total level of human-caused mortality and serious injury is unknown, but it is believed to be low relative to PBR; therefore, this is not a strategic stock~~

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